Speeding up Children Reunification in Disaster Scenarios via Serverless Computing

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Missing People After Natural Disasters

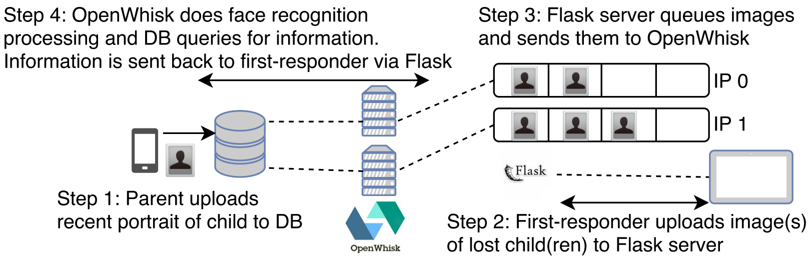
- 5192 Gulf Coast children missing after Hurricanes Katrina
- Federal government received 34,000 calls
- 6 months to reunite all of the children
- Many homeless, mentally disabled, and mentally ill adults missing after Hurricane Harvey

Overview

- Reunification requires identifying information about individuals
- Often, victims can not self identify
- Serverless database queries and face recognition for identification

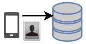
Architecture

Upload-Flask-OpenWhisk-Match


Step 4: OpenWhisk does face recognition processing and DB queries for information. Information is sent back to first-responder via Flask
Step 3: Flask server queues images and sends them to OpenWhisk
IP 0
IP 1
Flask
Step 1: Parent uploads recent portrait of child to DB
OpenWhisk
Step 2: First-responder uploads image(s) of lost child(ren) to Flask server

Upload

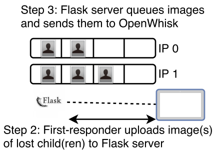
- Relatives upload information about missing child
  - Photo
  - Identifying features and information
  - Relative's contact Information



Step 1: Parent uploads recent portrait of child to DB

Flask

- First responders upload photo of victim
  - Can provide info on identifying features
- Flask queues and sorts images by unique IP of uploader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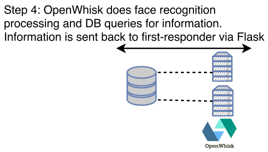
OpenWhisk

- Face Recognition and text-based DB queries
- Narrow search space by using any identifying information before face recognition
- Returns the contact information uploaded by the parent when a match is found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OpenWhisk

Why Serverless?

- Bursty computation
- Modular
- Implementation in an ad-hoc edge network
- Fast, scalable and federated profile matching
- OpenWhisk actions defined by machine learning (classification) operations